

REMARKS

Claims 1-29 are pending. Claims 1, 11, 16, 18, and 28 are in independent form.

Rejections under 35 U.S.C. § 102

CLAIM 1

In the action mailed December 21, 2006, claim 1 was rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent Publication No. 2003/0088715 to Chaudhuri et al. (hereinafter "Chaudhuri").

Claim 1 relates to a method that includes selecting from an inverted index at least a first item and a second item, determining whether to compress the second item entry into the first item entry, and compressing the second item entry into the first item entry based at least in part on the determination. The first item is associated with a first item entry having a first listing of articles associated with the first item. The second item differs from the first item and is associated with a second item entry having a second listing of articles associated with the second item.

The rejection of claim 1 is based on the contention that Chaudhuri's compression of a symbol table anticipates the subject matter recited in claim 1. Applicant respectfully disagrees.

In this regard, Chaudhuri deals with the searching of a relational database using an index of the data records in the relational database. *See, e.g., Chaudhuri*, para. [0008]. Such an index maps a data record to a region of the database in which the record is found. *Id.*, para. [0009]. For keyword searching, a symbol table is constructed that stores location information for each keyword. *Id.*, para. [0009].

Chaudhuri's FIG. 4 is an example of such a symbol table, and FIG. 5 is a compressed version of this symbol table. *Id.*, paras. [0015], [0016]. For the sake of convenience, these FIGS. are now reproduced.

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HashVal	Collid
v ₁	c ₁
v ₂	c ₁
v ₃	c ₁
v ₄	c ₁
v ₂	c ₂
v ₃	c ₂
v ₄	c ₂
v ₅	c ₂

Fig.4

HashVal	Collid
v ₁	c ₁
v ₂	x
v ₃	x
v ₄	x
v ₅	c ₂
NewCollid	Collid
x	c ₁
x	c ₂

134

135

Fig.5

Rather than store keywords directly in these symbol tables, the keywords are hashed into hash values (i.e., HashVal's) that are stored in the symbol tables, along with identifiers of the columns (i.e., Collid's) in which the keywords occurred. *Id.*, para. [0034]. These symbol tables thus associate 'keywords and the corresponding database tables and columns in which the keyword can be found.' *Id.*, para. [0031].

As can be seen from FIG. 4, some keywords appear at multiple locations in the relational database. For example, the keyword associated with the hash value "v₂" appears in the columns "c₁" and "c₂" in the relational database. The hash value "v₂" has multiple entries in the symbol table of FIG. 4, one for each of these locations. Chaudhuri describes that the multiple entries for such keywords can be compressed to yield the symbol table shown in FIG. 5. *Id.*, para. [0035]. In the compressed symbol table 134, the Collid "x" represents the conjunction of "c₁" and "c₂," as enumerated in ColumnsMap table 135. *Id.*

The rejection is based on the contention that this compression constitutes a compression of one item entry into another item entry. However, claim 1 also recites that:

- the first item entry has a first listing of articles associated with a first item;
- the second item entry has a second listing of articles associated with a second item; and
- the second item differs from the first item.

None of these elements and/or limitations is described or suggested by Chaudhuri's compression. As discussed, Chaudhuri's compression compresses associations of single hash values with single Collid's to single hash values with multiple Collid's. Before compression, none of the hash values has a "listing of articles" associated with them. Instead, each hash value has a *single* Collid associated with it. Chaudhuri's compression thus must occur before any selection of first and second items from an inverted index, as recited in claim 1. Chaudhuri thus neither describes nor suggests selecting first and second items from an inverted index, as recited in claim 1.

Moreover, it is clear that the single hash values which are compressed in Chaudhuri are identical to one another. For example, the hash value "v₂" that is associated with "c₁" is identical to the hash value "v₂" that is associated with "c₂." Since these hash values are identical to one another, Chaudhuri neither describes nor suggests compressing a second item entry into a first item entry where the second item differs from the first item, as recited in claim 1.

Since elements and/or limitations recited in claim 1 are neither described nor suggested by Chaudhuri, claim 1 is not anticipated by Chaudhuri. Accordingly, Applicant requests that the rejections of claim 1 and the claims dependent therefrom be withdrawn.

CLAIM 16

Claim 16 was rejected under 35 U.S.C. § 102(e) as anticipated by Chaudhuri.

Claim 16 relates to a method that includes selecting from an inverted index a plurality of items, determining whether to compress the plurality of items, and compressing the item entries based at least in part on the determination. Each item is different from the other selected items and each item has a listing of articles associated with the item.

The rejection of claim 16 is based on the contention that Chaudhuri's compression of a symbol table anticipates the subject matter recited in claim 16. Applicant respectfully disagrees.

In this regard, as discussed above, Chaudhuri describes that entries in a symbol table that each have the same hash value and are each associated with a single ColId can be compressed to yield a combined entry for that hash value that is associated with multiple ColId's.

Since each of Chaudhuri's hash values initially has a single ColId associated with it, Chaudhuri neither describes nor suggests selecting a plurality of items that have a listing of articles associated with them from an inverted index, as recited in claim 16. Indeed, Chaudhuri's compression must be performed beforehand in order for such a selection to be possible.

Moreover, since the single hash values which are compressed in Chaudhuri are identical to one another, Chaudhuri neither describes nor suggests compressing the item entries where each item is different from other selected items, as recited in claim 16.

Since elements and/or limitations recited in claim 16 are neither described nor suggested by Chaudhuri, claim 16 is not anticipated by Chaudhuri. Accordingly, Applicant requests that the rejections of claim 16 and the claims dependent therefrom be withdrawn.

CLAIM 18

Claim 18 was rejected under 35 U.S.C. § 102(e) as anticipated by Chaudhuri.

Claim 18 relates to a computer-readable medium that contains program code. The program code includes program code for selecting from an inverted index at least a first item and a second item, program code for determining whether to compress the second item entry into the first item entry, and program code for compressing the second item entry into the first item entry based at least in part on the determination.

The first item is associated with a first item entry having a first listing of articles associated with the first item. The second item is associated with a second item entry having a second listing of articles associated with the second item. The second item is different from the first item.

The rejection of claim 18 is based on the contention that Chaudhuri's compression of a symbol table anticipates the subject matter recited in claim 18. Applicant respectfully disagrees.

In this regard, as discussed above, Chaudhuri describes that entries in a symbol table that each have the same hash value and are each associated with a single ColId can be compressed to yield a combined entry for that hash value that is associated with multiple ColId's.

Since each of Chaudhuri's hash values initially has a single ColId associated with it, Chaudhuri neither describes nor suggests program code for selecting a first item and a second item that each have a listing of articles associated with them, as recited in claim 18. Indeed, Chaudhuri's compression must be performed beforehand in order for such a selection to be possible.

Moreover, since the single hash values which are compressed in Chaudhuri are identical to one another, Chaudhuri neither describes nor suggests program code for compressing the item entries where each item is different from other selected items, as recited in claim 18.

Since elements and/or limitations recited in claim 18 are neither described nor suggested by Chaudhuri, claim 18 is not anticipated by Chaudhuri. Accordingly, Applicant requests that the rejections of claim 18 and the claims dependent therefrom be withdrawn.

CLAIM 28

Claim 28 was rejected under 35 U.S.C. § 102(e) as anticipated by Chaudhuri.

Claim 28 relates to a computer-readable medium that contains program code. The program code includes program code for selecting from an inverted index a plurality of items, program code for determining whether to compress the plurality of items, and program code for compressing the item entries based at least in part on the determination. Each item is different from the other selected items. Each item has a listing of articles associated with the item.

The rejection of claim 28 is based on the contention that Chaudhuri's compression of a symbol table anticipates the subject matter recited in claim 28. Applicant respectfully disagrees.

In this regard, as discussed above, Chaudhuri describes that entries in a symbol table that each have the same hash value and are each associated with a single ColId can be compressed to yield a combined entry for that hash value that is associated with multiple ColId's.

Since each of Chaudhuri's hash values initially has a single ColId associated with it, Chaudhuri neither describes nor suggests program code for selecting a plurality of items that have a listing of articles associated with them from an inverted index, as recited in claim 28. Indeed, Chaudhuri's compression must be performed beforehand in order for such a selection to be possible.

Moreover, since the single hash values which are compressed in Chaudhuri are identical to one another, Chaudhuri neither describes nor suggests program code for compressing the item entries where each item is different from other selected items, as recited in claim 28.

Since elements and/or limitations recited in claim 28 are neither described nor suggested by Chaudhuri, claim 28 is not anticipated by Chaudhuri. Accordingly, Applicant requests that the rejections of claim 28 and the claims dependent therefrom be withdrawn.

Rejections under 35 U.S.C. § 103

CLAIM 11

Claim 11 was rejected under 35 U.S.C. § 103(a) as obvious over Chaudhuri, U.S. Patent No. 6,834,290 to Pugh et al. (hereinafter "Pugh"), and U.S. Patent No. 5,915,249 to Spencer et al. (hereinafter "Spencer").

Claim 11 relates to a method that includes selecting from an inverted index at least a first item and a second item, determining whether to compress a second item entry into a first item entry by determining a cost-benefit ratio for compressing the second item entry into the first item entry and comparing the cost-benefit ratio with an acceptable value to determine if the cost-benefit ratio is acceptable, and if the cost-benefit ratio is acceptable, compressing the second item entry into the first item entry based at least in part on the determination. The first item is associated with a first item entry having a first listing of articles associated with the first item comprising an item value for each article. The second item is associated with a second item entry having a second listing of articles associated with the second item comprising an item value for each article. The second item is different from the first item.

The rejection of claim 11 is based on the contention that the subject matter recited in claim 11 would have been obvious in light of Chaudhuri, Pugh, and Spencer. Applicant respectfully disagrees.

In this regard, as discussed above, Chaudhuri describes that entries in a symbol table that each have the same hash value and are each associated with a single ColId can be compressed to yield a combined entry for that hash value that is associated with multiple ColId's.

Since each of Chaudhuri's hash values initially has a single ColId associated with it, Chaudhuri neither describes nor suggests selecting a first item and a second item that each have a listing of articles associated with them, as recited in claim 11. Indeed, Chaudhuri's compression must be performed beforehand in order for such a selection to be possible.

Moreover, since the single hash values which are compressed in Chaudhuri are identical to one another, Chaudhuri neither describes nor suggests compressing the item entries where each item is different from other selected items, as recited in claim 11.

Pugh and Spencer do nothing to remedy these deficiencies in Chaudhuri. In this regard, Pugh deals with the development of reorganization plans for reorganizing the data in a database. *See, e.g., Pugh*, col. 1, line 21-23. Such reorganization plans are developed by considering the benefits and costs associated with reorganization of the objects of a database. *Id.*, col. 2, line 40-43. According to Pugh,

"the 'benefits' received from reorganization of a particular object, refer to a reduction in the reorganization need (N) of a particular object and an improvement in the free space distribution within the tablespace. The reorganization need of an object is reduced by, for example, recreating that object, and repopulating it with its data. The process of recreating and repopulating an object will generally eliminate wasted blocks in the object, reduce the number of chained rows, and reduce the number of extents allocated. The free space distribution in a tablespace is improved by, for example, causing free space to be organized into fewer, larger extents as opposed to many, smaller extents." *Id.*, col. 10, line 38-51.

Moreover,

“the “costs” associated with reorganization of a particular object, refer to the number of data blocks of data that are to be moved. As mentioned in the foregoing, movement of data takes the bulk of time and resources in the database.” *Id.*, col. 10, line 52-56.

Pugh’s reorganization is thus directed to improving free space distribution, recreating objects and repopulating them with their own data, and the like. These activities neither describe nor suggest selecting items that each have a listing of articles associated with them from an inverted index and compressing the item entries, as recited in claim 11.

Pugh shares these deficiencies with Chaudhuri. Thus, even if Chaudhuri were combined with Pugh (which applicant does not concede), one of ordinary skill would still not arrive at the subject matter recited in claim 11.

As for Spencer, Spencer is concerned with the *retrieval* of information from text databases. *See Spencer*, col. 1, line 6-10. To facilitate such information retrieval, Spencer describes that a persistent data structure can be used to store a static cache of documents for some (or all) of the terms in an inverted index, in parallel to the inverted index itself. *Id.*, col. 2, line 49-53.

Terms in Spencer’s inverted index are associated with (document, term frequency) tuples 204. *Id.*, FIG. 3a; col. 9, line 34-36. The “term frequency” information describes the number of occurrences of that term in the associated document. *Id.*, col. 9, line 39-40. According to Spencer,

“...without any compression techniques applied, each tuple requires typically 6 bytes, 3 bytes for a document identifier (sufficient to identify 2^{24} documents) and 2 bytes for the frequency, sufficient for up to 65,536 occurrences of a term in a document. Differential compression may be used to reduce these memory requirements.” *Id.*, col. 9, line 43-49.

Thus, when Spencer discusses compression, Spencer is understood to be referring to compression of the (document, term frequency) tuples rather than any compression of the terms in the inverted index.

Spencer thus neither describes nor suggests selecting items that each have a listing of articles associated with them from an inverted index and compressing the item entries, as recited in claim 11. Spencer thus shares these same deficiencies with Pugh and Chaudhuri. Thus, even if Spencer were combined with Pugh and Chaudhuri (which applicant does not concede), one of ordinary skill would still not arrive at the subject matter recited in claim 11.

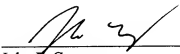
Since the combination of Chaudhuri, Pugh, and Spencer would not lead one of ordinary skill to select items that each have a listing of articles associated with them from an inverted index and compress the item entries, claim 11 is not obvious of Chaudhuri, Pugh, and Spencer in any combination. Accordingly, Applicant requests that the rejections of claim 11 and the claims dependent therefrom be withdrawn.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue, or comment does not signify agreement with or concession of that rejection, issue, or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

No fees are believed due at this time. Please apply any charges or credits to deposit account 06-1050.

Respectfully submitted,

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